

Cylindrical Robot

<https://www.youtube.com/watch?v=pkps69kg8OY>

This project presents the design and development of a Bluetooth Controlled Cylindrical Mobile Robot with an integrated pick-and-place mechanism. The system is built around the Arduino Nano, which acts as the central control unit. The robot is wirelessly operated using an Android smartphone through the HC-05 Bluetooth Module, enabling real-time control without physical connections.

The robot is powered by a rechargeable battery, and a LM2596 is used to regulate the voltage for safe operation of electronic components. Movement is achieved using three stepper motors controlled via a motor driver, allowing precise and stable navigation. Additionally, a servo motor is incorporated to control a gripper mechanism for object handling tasks such as picking and placing small items.

The cylindrical structure of the robot provides compactness and improved balance, making it suitable for confined environments. The system demonstrates efficient integration of wireless communication, motor control, and mechanical design. This project can be applied in areas such as industrial automation, material handling, and educational robotics, and it can be further enhanced with sensors and IoT-based automation for advanced applications.

Objectives:

- To design and develop a Bluetooth controlled cylindrical mobile robot.
- To implement wireless communication using the HC-05 Bluetooth Module for real-time control through a smartphone.
- To use the Arduino Nano as the main controller for processing commands and controlling system operations.

- To achieve smooth and precise robot movement using stepper motors and a motor driver.
- To integrate a servo motor-based gripper mechanism for pick-and-place operations.
- To design a stable cylindrical structure for improved balance and compactness.
- To ensure proper power management using a rechargeable battery and LM2596.
- To develop a system suitable for applications like material handling, surveillance, and educational robotics.

Components used:

- Battery Power Supply.
- Arduino Nano.
- HC-05 Bluetooth Module.
- Three Stepper Motors.
- Stepper Motor Driver.
- Servo Motor.
- Gripper.
- Thread Screw Mechanism.
- Connecting Rods.
- MS steel metal.

Software used:

- Embedded C Language.
- Arduino IDE.

- Express SCH for circuit design.



Block diagram of the project

